until after 4 p. m., but not so violent. According to Mr. Squirrell, other vessels in the vicinity also reported having felt the shocks.

Notwithstanding the gales referred to, the month as a whole was a quiet one, as would be expected from the advance of the season. This was particularly true of the southern part of the ocean. Mr. N. G. A. Parker, observer on the British S. S. *Nile*, Capt. C. H. Cross, states in his report:

551.506(73)

We left Yokohama on May 1 for Honolulu, taking the northern route or Great Circle track, 3,394 miles, and had an exceptionally fine passage, arriving at Honolulu on the morning of the 12th. I should say the month of May was ideal for such route.

Another interesting note is by Mr. G. Clarke, second officer and observer on the British S. S. *Empress of Japan*, Capt. W. Dixon Hopcroft, Yokohama for Vancouver (May 26–June 6). Mr. Clarke states that during the entire voyage the winds were from S. to NE., no westerlies.

WEATHER OF THE MONTH IN THE UNITED STATES.

In general.—The outstanding feature of the month was the anticyclonic control which persisted until the 20th. The anticyclones most influential in this regard had their origin in the Canadian Northwest; associated with their slow movement toward the east-southeast there was a drift of air from higher to lower latitudes and unseasonably cool days during the first half of the month. During the last half higher temperatures prevailed so that the month as a whole in New England, the Lake region, the great interior valleys, the Plains States and the West Gulf States, was one of temperature above the normal. Precipitation was deficient over the same identical regions, also in the north Pacific coast States. It was greater than the average in Atlantic coast districts from Cape Cod to Florida, also in Southern California and generally over the middle and southern plateau regions.

An event of more than passing interest was the severe magnetic storm of the 13th–17th. This storm was accompanied by distrubances of the magnetic and electrical conditions over a large portion of the earth and brilliant auroral displays. A brief summary of the distribution of the auroral display will appear in the June REVIEW.—*A. J. H.*

CYCLONES AND ANTICYCLONES.

By W. P. DAY, Observer.

Lows, as a rule, were ill defined and erratic in movement. Offshoots from the subpermanent low pressure area in the Southwest were frequent.

High pressure areas were numerous, but with one or two exceptions avoided interior districts, being more effective in Atlantic coast sections.

Tables showing the number of HIGHS and LOWS by types follow:

Lows.

	Alberta.	North Pacific.	South Pacific.	Northern Rocky Mountain.	Colorado.	Texas.	East Gulf.	South Atlantic.	Central.	Total.
May, 1921	2.0	1.0	4.0	2.0	1.0	1.0	1.0	.....	1.0	13.0
Average number, 1892–1912, inclusive	2.9	1.3	1.2	0.7	1.4	0.7	0.2	0.3	1.0	9.7

Highs.

	North Pacific.	South Pacific.	Alberta.	Plateau and Rocky Mountain region.	Hudson Bay.	Total.
May, 1921	3.0	1.0	5.0	.....	2.0	11.0
Average number, 1892–1912, inclusive	1.3	0.5	3.3	0.7	0.9	6.7

THE WEATHER ELEMENTS.

By P. C. DAY, Climatologist and Chief of Division.

[Weather Bureau, Washington, D. C., July 1, 1921.]

PRESSURE AND WINDS.

The atmospheric pressure exhibited two distinct types during the month and sharply contrasted weather conditions were the result.

During the first half of the month the pressure was persistently high along the northern border from the Rocky Mountains eastward, the so-called Polar Front extending well into the upper Mississippi Valley during the first few days, and, gradually drifting eastward, extending its influence into the Atlantic coast districts, where it diminished somewhat in force and near the end of the first decade gave signs of dissipating. However, early in the second decade, high pressure again became effective in the Northeastern States and Canadian Maritime Provinces, gradually extending southeast into the Atlantic and becoming central near the Bermudas by the middle of the month. During this period a second high-pressure area had moved into the upper Missouri Valley, and it too passed eastward over about the same course as that first mentioned. Upon reaching the Atlantic coast, however, it slowly settled to the southward, and near the beginning of the last decade of the month had become established over the Southeastern States with a corresponding movement of warm air from the south into the central valleys and thence eastward, where cool, northerly winds had prevailed so continuously during the earlier part of the month.

Low-pressure areas were usually ill-defined and few of them traversed long distances as well-developed storms. The average pressure for the month was highest over the Great Lakes and lowest in the far Southwest. In the districts east of the Rocky Mountains the average pressure was nearly everywhere greater than normal although usually the departures were less than one-tenth inch. Between the Rocky Mountains and Pacific coast, pressure averaged less than normal as a rule; although local areas in the valley of the Colorado River and along the immediate coast had departures slightly above normal.

High winds during the month were usually associated with thunderstorms only and hence were largely local and covered comparatively small areas, although about the first of the month high winds occurred over southern New England and along the middle Atlantic coast, and again about the 4th and 5th over the same districts.

The persistence of high pressure in the Great Lake region caused northerly winds over much of the Ohio Valley, Middle Gulf, and Atlantic Coast States, but between the Mississippi River and Rocky Mountains the wind was mainly from some southerly quadrant, and this was the case also in much of the Plateau region. In the far Northwest and generally along the Pacific coast the winds were from northerly to westerly points.

TEMPERATURE.

In the districts from the Rocky Mountains eastward the temperature during the month exhibited two distinct aspects. The first half of the month, and in a few sections of the middle West a few days beyond, the temperatures were almost continuously lower than the normal for the period, due principally to the persistence of high barometric pressure from the region of the Great Lakes to New England. Temperature changes during this period were usually small, but disagreeably cool, northerly to northeasterly winds prevailed, particularly over the Atlantic coast districts during the first week.

The average temperature for considerable portions of the period ranged from 5° to 10° per day below normal, especially in the Ohio Valley and to the southward during the first decade and in the more central and northern districts during the greater part of the second decade. West of the Rocky Mountains the first decade was mostly cooler than normal but the major portion of the second decade was comparatively warm.

Beginning slightly after the middle of the month most districts east of the Rocky Mountains had a gradual change to warmer weather, and the last two weeks of the month were distinctly warmer than normal in practically all portions of the country from the Rocky Mountains eastward. In the central valleys the average temperatures for this period ranged from 6° to 12° above the normal. Over the far western districts the temperatures during this period were mostly below normal, the first week being particularly cool in the far Southwest.

The main warm periods of the month were during the last decade, particularly about the 20th to 24th, when in the central valleys maximum temperatures were frequently above 100° and in a few cases the highest temperatures ever recorded in May were reported.

The lowest temperatures of the month were mainly during the first few days, particularly in the southern and far western States. In portions of the Lake region and Middle Atlantic States the lowest temperatures did not occur until slightly after the middle of the month.

The month as a whole was warmer than normal over much of the area where the temperatures have continued high during the entire winter and spring period just passed. In fact, over portions of the Middle West the average monthly temperatures have exceeded the corresponding normals for each of the past 9 consecutive months, the average for the entire period exceeding the normal by more than 5° per day.

PRECIPITATION.

During much of the first half of the first decade unsettled, showery weather prevailed in the Middle and North Atlantic States, the upper Ohio and most of the Mississippi Valleys, and in the Pacific Coast States from central California northward during the early part of this period, while during the latter half of the decade rain occurred in the far Southwestern States, including central and southern California where severe drouth had prevailed. The falls were heavy in the lower Mississippi Valley, portions of eastern Texas, and the Middle Atlantic Coast States.

Rainfall was frequent during the second decade from the Mississippi Valley eastward and occurred on two or three days in the northern Great Plains. During the first few days of the decade general rainfall was reported in the Southeast, except over the Florida Peninsula, and shortly after the middle of the month general rains occurred in all southeastern districts, where drouth more or less severe had prevailed, the falls being heavy in much of Florida and in southern Georgia; also rather extensive falls occurred in the Northwest about the close of the decade.

At the beginning of the third decade general rains occurred in the Plateau and south Pacific coast districts, the falls in southern California from the 20th to 23d being unusually heavy, in fact exceeding in some localities any previous records for May. About the middle of this period rainfall was general from the Ohio Valley northward and eastward, and local showers were frequent for several days from the upper Mississippi Valley westward to the Rockies, with some heavy falls in the northern Great Plains area. Rainfall was of a local character during the latter part of the month, and was confined principally to the Northern States.

For the month as a whole, precipitation was above the normal in the central and south Atlantic coast districts, in parts of the upper Mississippi and central Missouri Valleys, and in much of the area west of the Rocky Mountains. In the great central valleys the precipitation was usually considerably less than normal, and in a few small areas the total fall for the month was the least observed in May for more than 50 years.

SNOWFALL.

Snow was confined mostly to the mountain districts of the West and the amounts were small, except in northern Arizona where the fall was unusually heavy for May, though it melted shortly. At a few points in the high mountains of California the falls were likewise heavy, though not unusual for May, and similar conditions prevailed in the high mountains of Colorado.

East of the Rocky Mountains some snow occurred over the northern border States and in the Allegheny Mountain districts.

At Sault Ste. Marie, in the upper Michigan Peninsula, the heaviest snow ever reported in May, 4.5 inches, occurred on the 14th, causing considerable damage to trees.

RELATIVE HUMIDITY.

The distribution of the relative humidity outlined more directly the areas of excess and deficient precipitation than is usually the case. In the central valleys, where precipitation was markedly deficient, relative humidity also was quite deficient, whereas over the Atlantic coast districts the areas of excessive relative humidity coincided mainly with those having more than the normal precipitation. There was likewise an excess of humidity in the districts west of the Rocky Mountains, where precipitation was likewise mostly above average.

LOCAL STORMS.

May 4.—A severe wind and rain storm swept over New York City, Brooklyn, Staten Island, and vicinity about 7:00 p. m. The lighting and power plants were put out of service and car lines abandoned. Several persons were injured by signs blown down. Property damage about $100,000.

May 5.—A severe wind-and-rain storm passed over Los Angeles, Calif., about 8:00 p. m. Houses were unroofed, trees blown down, and much other property damaged. No loss of life.